

THE TRANSPERITONEAL EXAMINATION OF THE
URETER IN CASES OF SUSPECTED URETERAL
CALCULUS, AND THE COMBINED INTRA- AND
EXTRA-PERITONEAL URETERO-LITHOTOMY.¹

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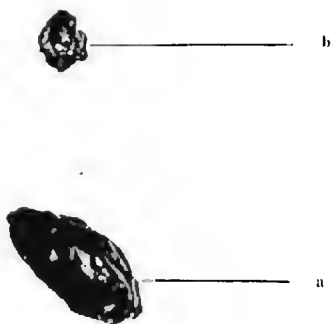
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DURING my recent service at the Pennsylvania Hospital I had three cases which illustrate well certain advantages to be derived from the transperitoneal examination of the ureter and the necessity for a thorough palpation of the ureter when the abdomen is opened for lesions of other organs, and especially for the less acute varieties of appendicitis. Before enumerating these advantages a brief report will be made of two cases of ureteral calculus in which the stone was located by transperitoneal palpation and removed by combined intra- and extra-peritoneal uretero-lithotomy and of a third case in which ureteral calculus was suspected but not found and yet in which the real lesion, a cystic kidney, was detected.

CASE I.—An Italian, 39 years of age, male, admitted to the Pennsylvania Hospital on August 3, 1905. The patient spoke English very badly but was sent in by his physician as a case of subsiding appendicitis. He gave a history of repeated attacks of pain in the abdomen, accompanied by vomiting and diarrhoea. The attacks lasted for three or four days, when he was able to get up and go about. Until the present attack he had been well for a year. The present attack had lasted for three or four days and was accompanied by vomiting. Excepting for some slight tenderness in the right iliac fossa the patient at the time of his admission was free of symptoms. There was no tenderness over the kidney and he complained of no urinary symptoms; there con-

¹ Read before the Philadelphia Academy of Surgery, February 5, 1906.



Ureteral calculi, exact size; a, Case I; b, Case II.

tinued a persistent tenderness on deep pressure in the right iliac fossa. He improved so much in a few days and the tenderness was so slight that my first inclination was to allow him to go out and return later if he had another attack. In other words, I was not prepared to accept the diagnosis of appendicitis. In view of the history, however, I concluded to operate. The patient's urine showed a number of red-blood corpuscles. Under chloride of ethyl-ether narcosis I operated on the 8th of August. The abdomen was opened through the right rectus and when searching for the appendix my finger came in contact with a hard mass just below the iliac vessels in the true pelvis. It seemed about the size of a hazelnut, was very hard, and at first immovable. Although shaped like a gland it was hard and there were no other glands enlarged. As it was in the line of the ureter I concluded it was probably a ureteral stone. I left it for further investigation and proceeded to examine the appendix. This organ showed evidences of an old inflammation, the vessels over it being very tortuous and there being numerous adhesions all about it excepting at the extremity. These adhesions bled quite freely when divided. The appendix stump was crushed with forceps and inverted by a purse-string suture of gut. In order to make a more thorough examination of the small mass in the pelvis I enlarged my incision downwards through the rectus. I was then able to determine that the mass was a stone in the ureter and decided to remove it extraperitoneally without however making another incision through the abdominal wall. The original incision was further increased downwards and the peritoneum stripped from the abdominal and pelvic wall down to the ureter. With one finger in the pelvic cavity I was able to push the ureter and stone up into the extraperitoneal wound within easy reach, but not within sight. I then opened the ureter longitudinally and removed a long, black stone about the size of the end of the little finger and cucumber shaped. In order to remove the stone quite a large opening was made in the ureter. A gauze drain was then passed down to the opening in the ureter and the peritoneal cavity was tightly closed with a continuous gut suture. The upper portion of the wound in the rectus was closed with sutures through its fascia. The superficial tissues were closed excepting at the lower end of the wound, where the gauze drain made its exit. In

spite of the flow of urine through the gauze, which was quite profuse for about two weeks, the abdominal wound healed without any infection. On the 2d of September very little urine was discharged from the sinus, and on the 6th of September the sinus was closed. It opened later, however, for a short time, but closed again.

CASE II.—A domestic, aged 32, was admitted to the Pennsylvania Hospital, August 12, 1905. This patient was sent into the hospital at night as a case of appendicitis and was seen in my absence, by Dr. Francis T. Stewart. Dr. Stewart did not think the case one of appendicitis or one demanding immediate operation. I saw her the next day and could not make up my mind that there was any inflammation of the appendix. She gave a history of repeated attacks of pain in the right side of the abdomen in the appendiceal region, accompanied by vomiting. The pain was more or less fixed, there being no radiation to the back or to the bladder: there were no urinary symptoms. The examination of the urine, however, on the day after admission showed a few red-blood corpuscles and a trace of albumin. Repeated examinations of the urine continued to show red-blood corpuscles. Examination of the abdomen the day after admission showed considerable tenderness over the right kidney. This, however, disappeared and the only tenderness was in the iliac region. A few days later the patient passed both blood and mucus by the bowel and the cæcum and sigmoid were quite tender. These symptoms did not persist, as did the microscopic blood in the urine. A differential diagnosis between appendicitis, colitis, renal calculus and ureteral calculus had to be made. With the disappearance of the renal tenderness and of the blood and mucus in the bowel movements, and in view of the absence of the characteristic symptoms of appendicitis, I made a diagnosis of a probable ureteral calculus on August 30th, and advised operation. This diagnosis was based on the continued tenderness in the iliac region, the repeated attacks of pain accompanied by slight rises of temperature, and especially the microscopic blood in the urine. Urinary symptoms were absent in this case, as in the previous one; there was no frequency of micturition and no pain in the bladder. The right kidney was not movable. The menses had been irregular and painful. I determined to follow the same

technique as in the previous case, especially as I was in some doubt regarding the diagnosis. Therefore, on the 31st of August under ethyl chloride-ether anæsthesia the abdomen was opened through the outer edge of the right rectus, low down, the appendix being readily found and removed as in the previous case; it was perfectly normal. The ureter, which was thickened, was easily felt crossing the iliac vessels. About one inch below the vessels a hard, small, immovable mass was felt. The peritoneum was stripped away from the abdominal and pelvic walls after increasing the incision downwards. The ureter was exposed and brought plainly into view. Great assistance was also derived in this case from a finger within the pelvis pushing the ureter up into the extraperitoneal wound. The ureter was incised longitudinally and a small irregular stone, very rough and adherent to the ureteral mucous membrane, was removed. A gauze drain was inserted down to the ureteral wound, the peritoneal cavity was closed, and all but the lower portion of the wound in the abdominal wall. Although in this case a smaller incision in the ureter was required than in the previous one, there was a greater and more prolonged leakage of urine. The abdominal wound healed promptly excepting at the point of drainage, and the patient never had an abdominal symptom. On September 30th, one month after the operation, there was no flow of urine, there was, however, some discharge from the drainage tract which remained open for about two weeks. The patient was discharged on November 29th, the wound having remained closed for about a week.

CASE III.—A man, aged 22, admitted to the Pennsylvania Hospital, December 21, 1905. This patient had been in the hospital a number of times, once for typhoid fever, again in December, 1903, for an appendiceal abscess which was operated upon by Dr. Le Conte: in February, 1904, he was again admitted suffering from attacks of pain which seemed to indicate a renal calculus. At this time Dr. Harte explored the left kidney but found no stone. Upon his last admission the patient stated that since his last operation he had had attacks of pain coming on every few weeks. The character of the pain was much the same as in his previous attacks and was accompanied by nausea and vomiting and fever. At the time of his admission he was suffering con-

siderable pain and had some temperature. This promptly subsided and he was quite comfortable the next day. When examined there was considerable tenderness in the left lower abdomen and the pain extended down to the bladder and into the left lumbar region. Later, the tenderness seemed more marked over the kidney and ureter. The tenderness over the kidney gradually disappeared but that in the left iliac region and in the course of the ureter remained. On admission there were a few red-blood corpuscles in the urine, but these were not found at any of the subsequent examinations. As the kidney had been thoroughly explored only ten months before and as the tenderness persisted over the ureter, I determined to explore this organ. As there was nothing to indicate the exact situation of the supposed stone I determined to open the abdomen as in the two previous cases and thoroughly palpate the entire urinary tract. On December 30th, under ethyl chloride-ether anæsthesia, I made an incision through the left semilunar line into the abdominal cavity. I had no difficulty in finding the ureter and tracing it from the bladder to the kidney. It was normal in size and there was no evidence of any stone. The right ureter also could be felt in its lower portion and there was nothing abnormal about it. I had previously examined the bladder for stone with a negative result. On palpating the kidney through the wound I discovered it to be enlarged and cystic. The patient was turned on his abdomen, the kidney exposed through a straight incision in the lumbar region, and removed. During the separation of the kidney from the peritoneum I kept one hand in the abdominal wound as a guide. This greatly facilitated the separation of the kidney, which was densely adherent at its lower pole to the colon and peritoneum. The abdominal wound was closed before the nephrectomy was completed. Several of the cysts were ruptured before the kidney was delivered but not before the abdominal wound was closed. The fluid in the kidney did not have an ammoniacal odor and was of a milky consistency. The whole kidney was a mass of large cysts. The pedicle was ligated *en masse* and the individual vessels tied with smaller gut. A small drain was inserted. The patient's convalescence was perfect, excepting for a severe pneumonia which he developed promptly after the operation. It is interesting to note that this pneumonia

occurred in the right lung. A few days after the operation he was passing as much as sixty-five ounces of urine. There was no doubt from the examination of the kidney and from the character of its contents that the right kidney was secreting all the urine passed at the time the operation was done.

Palpation of the ureter through an abdominal wound is nothing new. I have for some time made it a routine procedure in all cases where the abdomen is opened for other conditions and where these conditions do not seem to be sufficient to account for all the symptoms, and I am especially careful to do this in all interval operations for appendicitis. Although never generally advocated, the immediate removal of a stone detected by palpation through the abdomen has been practiced, yet, so far as I can learn, the removal has been done through the peritoneum or through one of the various extraperitoneal incisions, such as the lumbar, iliac, inguinal, sacral, vaginal or rectal. I believe then that the practice in the two cases reported by me of the removal of the stone extraperitoneally but through the same incision in the abdominal wall, and while the abdominal wound remained open, has not before been employed. Most authorities recommend the closure of the peritoneal cavity and the making of another incision for the extraperitoneal exposure and removal of the stone. In the two cases just described there was no doubt of the great advantages to be derived from having a finger in the peritoneal cavity and on the stone during the exposure of the ureter in the extraperitoneal portion of the wound. An objection to this method which naturally presents itself is the danger of infection of the peritoneum, but in neither of my cases did this occur and if the operator hesitates to open the ureter while the peritoneal wound is still open he can easily close the latter after the thorough exposure of the ureter; he will then have had all the advantage of the finger in the abdomen during the exposure of the ureter and the location of the stone. With a certain amount of care, however, I know that infection of the peritoneal cavity can be avoided, and moreover that the exposure of the ureter and extraction

of the stone are easier and accompanied by less injury of the ureter itself when the operator has the assistance of a finger in the pelvis pushing the stone and ureter up into the extraperitoneal wound.

Another advantage to be derived from the manipulation both within and outside the peritoneum is the fact that in this way the ureteral stone can be more easily forced into the bladder if this is thought possible or back into the dilated ureter where an incision is apt to close earlier and better than at the site where the stone has been arrested. Case III illustrates the advantage of intraperitoneal examination of the ureter, even when no stone is present. It enabled me in this case to detect a cystic kidney on the left side which I would not have been able to diagnose by palpation until it had reached much greater size. In a certain number of cases of stone in the lower portion of the ureter it is difficult to determine in which ureter the stone is. In such cases localization through an abdominal incision is strongly recommended.

From the limited experience gained by these two cases I am not prepared to advise the removal of every ureteral stone by the combined intra- and extraperitoneal method, but in all doubtful cases and in all cases where a stone is found in a ureter when the abdomen has been opened for some other condition I do advocate its immediate removal either through a separate incision or after the manner just described. To remove these stones through the peritoneum is seldom justifiable, as the risks of a peritonitis are too great.

In neither of the above cases was the ureter sutured. I felt that the wound would close after simple drainage just as the common duct closes after the removal of a stone. In any future cases, however, I think I shall close the incision in the ureter and introduce a drain down to the sutures. Henry Morris states in this connection that suture of the ureter is of doubtful utility when it is much damaged and that it may be harmful.

I would urge the careful palpation of the ureter in all cases where the abdomen is opened for chronic or subacute inflammation of the appendix or uterine appendages. And also that where nephrotomy is done for stone, whether a stone is found or not, a thorough examination of the ureter, by means of a ureteral probe, should be made. One of the great objections to the use of the ureteral probe through the bladder is the difficulty of catheterizing the ureters in the male, and the further difficulty of differentiating a stone from some other form of obstruction, such as a kink or stricture. The presence of microscopic blood in urine, especially after an attack of pain, is of great diagnostic value.